

PROGRESS REPORT

GRANT NUMBER: 7310035

High Capacity Airborne Wind Turbine

Altaeros Energies

08/31/2012 – 07/31/2013

Deliverables Submitted

No official deliverables were scheduled to be submitted this period.

Although the project commenced on August 31, 2012, the grant agreement was not signed until April 19, 2013. Therefore, this is our first official report and will include the entire August 2012 to July 2013 period. We will report quarterly going forward.

Budget

The amount invoiced to AEA is for \$92,496 out of a total of \$132,124. The main expenses were for:

- Altaeros salary for Task 1-3
- Travel expense for Altaeros site selection trip to Fairbanks and Anchorage region
- Equipment and materials for Task 2
- Outside service for Task 1
- Utilities and Rent for Task 2

Amount Invoiced: \$92,496

Match Recorded: \$39,629

Schedule Status

Our project is on schedule. Site selection and permitting kicked off as scheduled in March 2013, and our turbine development and instrumentation work kicked off in July as scheduled.

Percent Complete

Tasks/Milestones	Start Date	End Date	Percent Complete
Task 1: Final site selection, permitting, and community forum	Mar-13	May-14	40%
Task 2: 30 kw turbine assembly and testing in Maine	Jul-13	May-14	15%
Task 3: Complete instrumentation plan and shakedown test plan	Jul-13	Feb-14	10%

Work Progress

Task 1:

- Site Selection
 - Altaeros Energies, TDX Power, and Tom Lovas worked together to identify 15 potential sites for the project. The team evaluated sites on a 6-variable matrix to rank order them (see APPENDIX 1). Meeting held with AEA to get feedback on sites.
 - For the top 5 sites, Adam Rein and Ben Glass of Altaeros Energies travelled to Alaska to meet with our partners and do site visits (see APPENDIX 2 for photos).
 - Delta Junction – Very favorable visit and meeting with site owner Mike Craft. Specific site coordinates identified. Crucial issue to be evaluated is airspace permitting given airport within 5 miles.
 - Eva Creek – Very favorable site visit and meeting with GVEA. Two potential site coordinates identified. GVEA gave full support for the project. Crucial issue to be evaluated is accessibility due to rail car required to transport to site.

- Murphy Dome – Site visit completed. Deemed less attractive due to difficulty of three obstructions at site: FAA equipment, Air Force Dome, and 100ft communications tower.
- JBER – After speaking with military rep, deemed less attractive due to visibility from Anchorage, lack of military support, and challenge deploying at an active base.
- Mat-Su Valley site visit completed. Deemed less attractive due to visibility from Anchorage and interference with ski resort at all appropriate locations.
- Nikiski, Homer, Seward, Bird Point, Fire Island, and other sites all deemed to be low priority due to expected airspace challenges.
- Permitting
 - Environmental Assessment of the Altaeros Airborne Wind Turbine completed by Normandeau Environmental Consultants. The report concluded:
 - “Using best professional judgment based on our experience with conventional land-based wind turbines and the information available at this time, Normandeau Associates concludes that, on average, the deployment of the AMWT is likely to have **equal or lesser overall environmental impact** than the deployment of tower-mounted wind turbines of similar size.”
 - The two largest environmental impacts to mitigate were deemed to be airspace interference with low flying aircraft, and potential impact of the tethers on migratory birds.
 - Phone call held with Fish & Wildlife Service at AEA offices.
 - FWS representative indicated that no material impact expected, especially if project sited at existing Delta Junction or Eva Creek wind farms, that were deemed to have limited avian impact
 - If deployed at Eva Creek, will check eagle locations to minimize potential impact.
 - Held initial conversation with Alaska FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) office to discuss airspace permitting.
 - The office has heard of and is familiar with Airborne Wind Turbines.
 - The office confirmed that the FAA application process is the same for this application as for a standard tower mounted wind turbine
 - The next step is for Altaeros to submit an application for a specific site, at which time the FAA will conduct a basic aeronautical study.
 - They identified night-time tether lighting as a key issue if we want to deploy at night, unless we want to apply for restricted airspace.

Task 2:

- 30 kw turbine assembly and testing in Maine (see Appendix 3)
 - Team is currently in final assembly of a smaller half-size inflatable shell to evaluate refined aero and control design, stability and reliable performance to guide the development of the 30kW prototype.

- Team of five engineers began initial design work of inflatable shell and completed modifications to docking trailer
- Team completed successful wind tunnel and water tunnel of the inflatable shell design.
- Team travelled to Maine in July to setup test site including test equipment, helium.
- Completed design spec and purchase of electrical cable and tethers for Maine test.

Task 3:

- Instrumentation plan and shakedown test plan
 - Dr. Chris Vermillion identified instrumentation and purchased a number of sensors for testing on the 25 ft inflatable shell.

Future Work**Task 1:**

- Site Selection
 - Determine specific site coordinates (latitude/longitude) at Delta Junction and Eva Creek.
 - Get follow up information on site map, wind data, and any other interconnect information needed.
 - Make determination about which 1 or 2 specific sites will be submitted to the FAA.
 - No problems expected, except perhaps difficulty in obtaining all site information.
- Permitting
 - Work with Airspace legal or consulting expert to develop strategy for approval.
 - Once final site coordinates have been determined, submit an FAA application to seek airspace approval following aeronautical study.
 - FAA approval is a materiel risk given that this is a first-of-its-kind project. We are mitigating this risk by working with FAA experts to draft our proposal. In addition, we are prepared in our timeline to resubmit with additional information or to resubmit at a second site if needed.
- Community Assessment
 - Initiate follow up conversations to test hypothesis of no community concerns expected at top 2 potential sites, given that they are next to existing wind farms that have had no community concerns and are relatively remote.

Task 2:

- 30 kw turbine assembly and testing in Maine
 - Complete half-scale airborne testing of inflatable shell.
 - Begin 30kW prototype design
 - Complete test of small wind turbine using modified design to guide 30kW blade design

Task 3:

- Instrumentation plan and shakedown test plan
 - Assess performance of instrumentation in 25ft shell test

APPENDIX 1

Site Selection - Altaeros 30kW Wind Turbine									
Selection Criteria [Score 1 (low) to 4 (high)]									
Possible Locations	Notes	Ease of Permitting (FAA)	Ease of Site Prep: Interconn/terrain	Access from Anchorage	Community Acceptance	Ease of Install/O&M	Adjacent data for Benchmarking	Total	Primary Contact
Delta Junction	Previous issue,	4	3	3	4	3	4	21	Mike Wright/Corey Borgeson/Mike Craft
Eva Creek	Wind farms on	4	3	2	4	2	4	19	Mike Wright/Corey Borgeson
JBER Site Summit	Near Anchorage	3	4	4	3	3	2	19	Doyon
Mat/Su Valley	Unknown, close to	2	4	4	3	4	2	19	Griffith/Kuhn
Nikiski	Favorable interconn	2	4	3	3	4	2	18	Ambrose/Janorske
Homer Hilltop		2	4	3	4	3	1	17	Harvey Ambrose/Brad Janorske
Seward		2	3	3	3	4	2	17	John Foutz
Bird Point		1	3	4	2	4	2	16	Paul Risse/Brad Evans
Fire Island		2	3	2	3	2	4	16	Ethan Schutt/Suzanne Gibson
Portage Valley		1	4	4	2	3	2	16	Chugach
Tok		2	3	2	4	2	2	15	Bob Grimm/Ak Power & Telephone
Thompson Pass		1	3	2	3	3	2	14	Wilkinson/Copper Valley

APPENDIX 2

Site Visit Murphy Dome



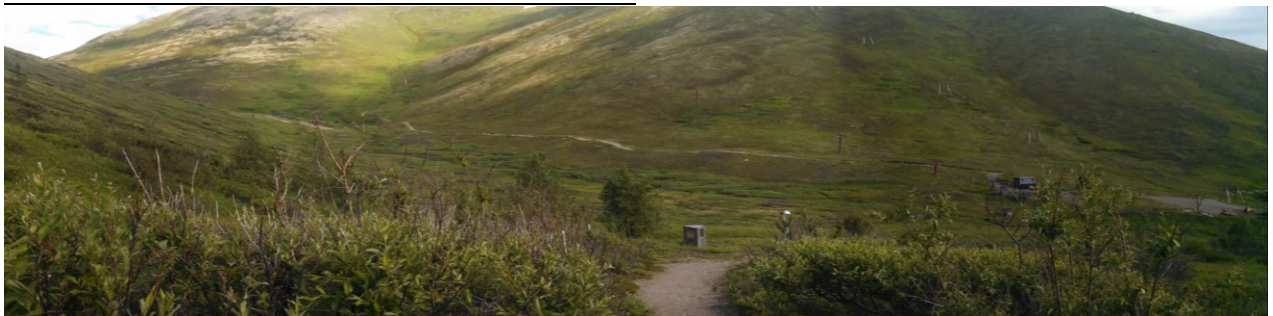
Site Visit Delta Junction



Site Visit Eva Creek

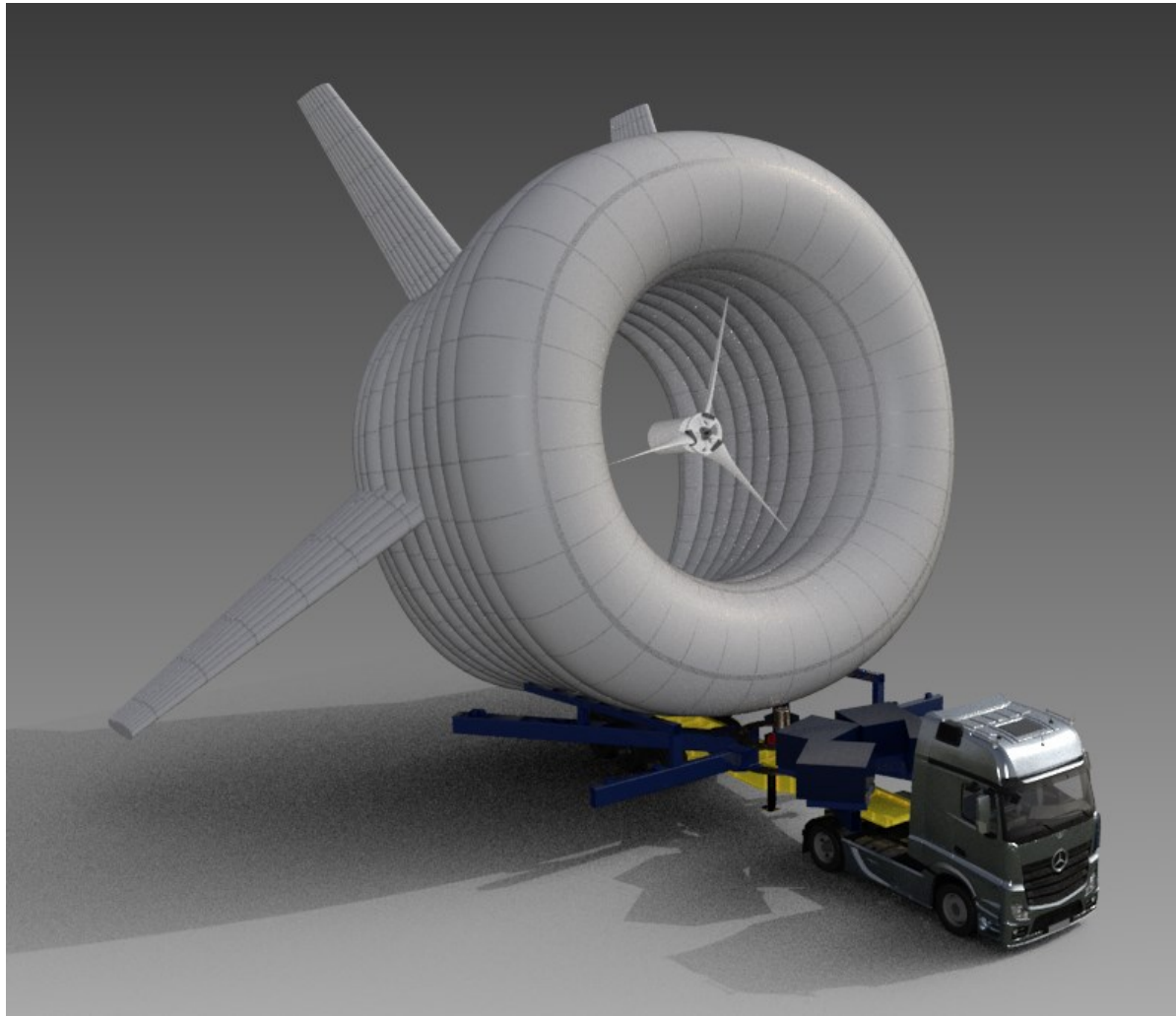


Site Visit Mat-Su Valley



Appendix 3

Initial 30kW design – July 2013



Team setting up Maine site and retrofitting docking trailer – July 2013

